

## PATENT CLAIMS

1. A superconducting resistive current limiter adapted for a nominal voltage  $U_N$  and  
 5 carrying a nominal current  $I_N$  at a working temperature  $T_N$ , with at least one track  
 (1) of length  $L_{tot}$  comprising a thin-film of high-temperature superconducting  
 material with a critical current density  $J_C$  and an electrical bypass layer in contact  
 with the film, wherein the track (1) consists of a multitude of constrictions (2)  
 having a total length  $L_C$  and each having an approximately constant critical current  
 10  $I_{C,C}$  equal to the nominal current  $I_N$  and being separated from each other by  
 connecting sections (3) having a critical current  $I_{C,S}$  larger than  $I_N$ ,  
 characterized in that the total resistance  $R_C$  of the constrictions (2) at working  
 temperature  $T_N$  is adapted to cause a voltage drop equal to the nominal voltage  $U_N$   
 at an initial fault current  $I_b$  limited to a value below a prospective fault current.
- 15 2. The current limiter according to claim 1, characterized in that the resistance  $R_C$  of  
 the constrictions (2) at an initial fault current  $I_b$  with a current density  $J_b$  of  
 approximately 1.5 times  $J_C$  flowing in the constrictions (2) is adapted to cause a  
 voltage drop  $U_C = R_C$  times  $I_b$  equal to the nominal voltage  $U_N$ .
3. The current limiter according to claim 2, characterized in that an averaged reduced  
 20 resistivity  $\rho_C$  of the constrictions (2) at working temperature  $T_N$  and at the initial  
 fault current density  $J_b$  is adapted to limit the surface power density  $p_b$  dissipated by  
 the constrictions (2).
4. The current limiter according to claim 3, characterized in that the averaged reduced  
 resistivity  $\rho_C$  of the constrictions (2) is given by  $\rho_C = p_b / J_b^2 \cdot e$ , wherein  $e$  is the  
 25 thickness of the superconducting film at the constrictions.
5. The current limiter according to claim 4, characterized in that the conductivity of  
 the bypass layer is higher along the constrictions (2) than along the connecting  
 sections (3).
6. The current limiter according to one of claims 1 to 4, characterized in that the  
 30 constrictions (2) are divided into two or more paths (20) electrically connected in  
 parallel.